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**Breakthroughs in cell therapy for heart disease: focus on cardiosphere-derived cells.**

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**Funding Grants:** Mechanism of heart regeneration by cardiosphere-derived cells

**Public Summary:**

The clinical reality of cell therapy for heart disease dates back to the 1990 s, when autologous skeletal myoblasts were first transplanted into failing hearts during open-chest surgery. Since then, the focus has shifted to bone marrow-derived cells and, more recently, cells extracted from the heart itself. Although progress has been nonlinear and often disheartening, the field has nevertheless made remarkable progress. Six major breakthroughs are notable: (1) the establishment of safety with intracoronary delivery; (2) the finding that therapeutic regeneration is possible; (3) the increase in allogeneic cell therapy; (4) the effect of increasing mechanistic insights; (5) glimmers of clinical efficacy; and (6) the progression to phase 2 and 3 studies. This article individually reviews these landmark developments in detail and concludes that the field has reached a new phase of maturity where the prospect of clinical impact is increasingly imminent.

**Scientific Abstract:**

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